

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problems Mailbox.**

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE
in its capacity as elected Office

Date of mailing (day/month/year) 05 January 2001 (05.01.01)	
International application No. PCT/GB00/01892	Applicant's or agent's file reference I13319WO-LH/ATB
International filing date (day/month/year) 17 May 2000 (17.05.00)	Priority date (day/month/year) 21 May 1999 (21.05.99)
Applicant BEIGHTON, Ashley, Thomas	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
06 December 2000 (06.12.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Juan Cruz Telephone No.: (41-22) 338.83.38
-----------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference I13319W0-LH/ATB	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 01892	International filing date (day/month/year) 17/05/2000	(Earliest) Priority Date (day/month/year) 21/05/1999
Applicant BEIGHTON, Ashley Thomas		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PC.7GB 00/01892

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E04B1/348 E04B1/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 444 130 A (WYBAUW JACQUES) 11 July 1980 (1980-07-11)	1-5, 7, 8, 10-12, 14-17, 21, 25-27, 31-33, 35-38, 40
Y	the whole document	22-24, 28-30
A	---	9, 13
	--- -/--	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

5 September 2000

Date of mailing of the international search report

11/09/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Delzor, F

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/01892

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 23 06 865 A (FUHRMANN HANS JOACHIM) 22 August 1974 (1974-08-22)	1-4, 14, 25-27, 31-36, 38-41
A	the whole document	22, 32, 33, 37, 42
Y	US 3 818 654 A (SCHRAMM R) 25 June 1974 (1974-06-25) the whole document	22-24, 28-30
A	US 4 766 708 A (SING PETER) 30 August 1988 (1988-08-30) the whole document	41, 42

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/01892

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2444130	A	11-07-1980	AR 221389 A	30-01-1981
			AT 755079 A	15-03-1985
			AU 530363 B	14-07-1983
			AU 5330379 A	10-07-1980
			BE 880525 A	10-06-1980
			BR 7908052 A	08-07-1980
			CA 1129617 A	17-08-1982
			CH 635641 A	15-04-1983
			CU 35191 A	28-03-1982
			DD 147702 A	15-04-1981
			DE 2965875 D	18-08-1983
			DK 523979 A	12-06-1980
			EP 0012736 A	25-06-1980
			ES 257026 U	16-12-1981
			FI 793850 A	12-06-1980
			GB 2040334 A, B	28-08-1980
			GR 73603 A	26-03-1984
			IE 49009 B	10-07-1985
			IL 58909 A	30-04-1982
			IN 153401 A	14-07-1984
			IT 1119965 B	19-03-1986
			JP 1348481 C	13-11-1986
			JP 55081949 A	20-06-1980
			JP 61014299 B	18-04-1986
			KE 3638 A	20-06-1986
			LU 81973 A	01-07-1980
			MX 149994 A	27-02-1984
			MY 98685 A	31-12-1985
			NO 794015 A	12-06-1980
			NZ 192297 A	15-07-1983
			OA 6422 A	12-06-1979
			PL 220316 A	20-10-1980
			PT 70541 A	01-01-1980
			TR 22071 A	11-03-1986
			US 4364206 A	21-12-1982
			ZA 7906670 A	26-11-1980
DE 2306865	A	22-08-1974	NONE	
US 3818654	A	25-06-1974	NONE	
US 4766708	A	30-08-1988	JP 62160375 A	16-07-1987

14
REC'D 22 AUG 2001

WIPO

PCT

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference I13319WO-LH	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/01892	International filing date (day/month/year) 17/05/2000	Priority date (day/month/year) 21/05/1999
International Patent Classification (IPC) or national classification and IPC E04B1/348		
Applicant BEIGHTON, Ashley Thomas		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 6 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 12 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 06/12/2000	Date of completion of this report 20.08.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Rosborough, J Telephone No. +49 89 2399 2818 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/01892

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1,8-21 as originally filed

2-7 as received on 09/03/2001 with letter of 08/03/2001

Claims, No.:

1-39 as received on 09/03/2001 with letter of 08/03/2001

Drawings, sheets:

1/13-13/13 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/01892

- ☐ the description, pages:
☒ the claims, Nos.: 40-43
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-39
	No: Claims
Inventive step (IS)	Yes: Claims 1-39
	No: Claims
Industrial applicability (IA)	Yes: Claims 1-39
	No: Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/01892

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: DE 23 06 865 A

D2: FR-A-2 444 130.

5.1 Independent Claim 1.

Document D1, which is considered to represent the most relevant state of the art, discloses:

- a building structure comprising:
- a support module; and
- a plurality of enclosed room modules, each room module being independently attachable to the support module

from which the subject-matter of claim 1 differs in that:

- each room module is independently cantilevered from the support module.

The subject-matter of claim 1 is therefore novel (Article 33(2) PCT).

The problem to be solved by the present invention may therefore be regarded as: to simplify the attachment of the room module to the support module.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The supports ("Stützvorrichtungen") are disclosed throughout D1 as being a requirement for secure support of the room modules, whether they are in the form of protruding buttresses - as depicted in "Skizze - F" F1 to F3, or in the form of additional supports at or near the end of the room module remote from the support module - as

depicted in "Skizze - F" F4 and F5.

Document D2 discloses room modules which are not enclosed but which are open on two ends (see fig.1). Even in the case that the person skilled in the art should decide to fix the facade panel (PF) to the room module prior to connecting said module to the support module, there is no reason for him to introduce an additional panel to close the remaining open end of the room module, as this end is closed by the wall of the support module (CC) to which the room module abuts (see fig.4).

5.2 Independent Claim 35.

For the reasons provided under item 5.1, the subject-matter of claim 35 also conforms to the requirements of Articles 33(2) and (3) PCT.

The enclosed room modules according to D1 are not disclosed as being suitable for independent cantilevered attachment, but as always requiring support from beneath.

5.3 Independent Claims 36 and 39.

Independent claims 36 and 39 are directed to a method of, and a kit for, building a building structure comprising implicitly all the features of claim 1 and therefore the subject-matter of said claims also conforms to the requirements of Articles 33(2) and (3) PCT.

5.4 Dependent Claims 2-34,37 and 38.

Claims 2-34,37 and 38 are dependent on claims 1 and 36 respectively, and as such also meet the requirements of the PCT with respect to novelty and inventive step.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/01892

Re Item VII

Certain defects in the international application

7.1 Prior Art.

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1,D2 is not mentioned in the description, nor are these documents identified therein.

7.2 Two-Part Form.

The independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

7.3 Reference Signs.

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Re Item VIII

Certain observations on the international application

8.1 Clarity, Claims 21 and 22..

Claims 21 and 22 do not meet the requirements of Article 6 PCT, as it is not clear which chassis (that of the room module or that of the support module - both of which are referred to in claim 20, from which claims 21 and 22 depend) is being referred to by the expression "the chassis" (claim 21, line 2, claim 22, line 1).

Title: Improvements In Or Relating To Building Structures

Description of Invention

THIS INVENTION relates to improvements in or relating to building structures and more particularly to a modular building structure and method of producing the same.

The construction of any building such as a house, factory or the like typically involves the laying of a foundation, such as the establishment of footings to define the floor plan and room arrangement, the building of structural walls and the provision of a roof structure. A single building contractor would usually undertake all of this work although some aspects may be contracted out either by the contractor or by the principal. Once this work is completed, or in parallel therewith, other contractors will normally be involved in the building work such as plumbers, electricians, joiners, plasterers and decorators. It can therefore be appreciated that not only is this work being carried out in one location, but also that a great many contractors are required to produce a single building. This results in a complicated process since there are typically many lines of communication necessary and there is often significant overlap and conflict in both the working areas required for each trade and in the responsibility for various jobs.

Prefabricated building methods can be employed when it is desirable to move either all or a proportion of the work off-site. These methods broadly fall into two categories: pre-fabricated components and pre-fabricated 'volumetric'

modules. The use of either technique can be applied to a greater or lesser extent in any building depending on the relative importance of factors such as programme time, location, cost and quality. In addition, the degree to which the component or 'volumetric' module is itself prefabricated will be affected by similar factors.

Examples of such components may range from doors and windows to floor and wall panels. Examples of 'volumetric' modules may range from bathroom modules used in buildings such as hotels to fully finished houses.

The application of all of the above techniques results however in the building of a complete structure which, once completed, is substantially set in its size, design and configuration.

It is an object of the present invention to provide an improved building structure and method of producing the same which offers a building having a flexible size, design and configuration. It is a further object to provide a building having rooms which are replaceable and can therefore be readily upgraded to a higher specification or their functionality changed.

Accordingly, one aspect of the present invention provides a building structure comprising: a support module; and a plurality of room modules, each room module being independently attachable to and cantilevered from the support module.

Advantageously, the support module supports one room module above another, the room modules being vertically spaced apart from one another.

Preferably, the support module supports one room module adjacent another, the room modules being horizontally spaced apart from one another.

Conveniently, each room module is spaced apart from the or each adjoining room module.

Advantageously, a cladding is provided around the building structure.

Preferably, the cladding is attached to and supported by a foundation.

Conveniently, the cladding is attached to and supported by a roof structure.

Advantageously, the cladding is attached to and supported by at least one room module.

Preferably, the cladding comprises a plurality of demountable panels.

Conveniently, the support module supports a roof structure which covers the support module and each room module, the roof structure being spaced apart from the or each adjoining room module.

Advantageously, the roof structure includes a room module.

Preferably, a foundation structure underlies the support module, the foundation structure being spaced apart from the or each adjoining room module.

Conveniently, the foundation structure has a main portion upon which the support module sits and one or more stabilising portions extending from the main portion.

Advantageously, the main portion is a foundation slab.

Preferably, the or each stabilising portion underlies one or more room modules and is spaced apart from the or each adjoining room module.

Conveniently, the stabilising portion comprises a frame of foundation material having an outer perimeter, the centre of the frame being a void.

Advantageously, the foundation structure is manufactured as a precast concrete structure.

Preferably, one or more piles extend from the foundation structure into the underlying ground.

Conveniently, a room module comprises a chassis defining a volume, the chassis having attachment means to co-operate with corresponding attachment means provided on a chassis of the support module.

Advantageously, panels are provided between the members of the chassis to provide side walls, a floor and a ceiling.

Preferably, the chassis is constructed from one or more upper and lower members connected rigidly by upright members but not braced by diagonal members, the rigidity of the chassis being secured by rigidity at the chassis joints.

Conveniently, a room module includes one or more internal partitions to define one or more rooms in each room module.

Advantageously, a room module includes at least one door aperture.

Preferably, a room module includes at least one window aperture.

Conveniently, the support module comprises a load bearing chassis having attachment means to co-operate with corresponding attachment means provided on a chassis of a room module.

Advantageously, the attachment means on the support module comprises a longitudinal array of spaced apart attachment locations provided along a chassis member of the support module, each of which attachment locations is suitable for co-operation with and attachment to corresponding attachment means provided on a chassis of a room module, the position of attachment of the room module with respect to the support module being variable by attaching the room module at different locations along the chassis member of the support module.

Preferably, the attachment means comprise a plurality of holes formed in the chassis of the support module and the room module, the holes being alignable to receive therethrough a locking bolt to secure the room module to the support module.

Conveniently, the support module includes a circulation passage having access to each room module attached thereto.

Advantageously, a further support module is attachable on top of the support module to provide a further storey to the building structure.

Preferably, a further support module is attachable adjacent the support module to provide a plurality of support members in side by side engagement.

Conveniently, the building structure has a plurality of storeys and a single support module from which the room modules are cantilevered.

Advantageously, the services for the building are principally routed through the support module, thereby facilitating the connection of services to each room module attached to or attachable to the support module.

Preferably, each room module has services fitted in preparation for connection to corresponding services on the support module.

Conveniently, the or each support module has demountable wall panels, the wall panels being blank panels for walls of the support module which do not require an aperture therein and wall panels having an aperture therein for walls of the support module which do require an aperture therein, an aperture in a wall panel of the support module being alignable with an aperture in a wall panel of a room module.

Another aspect of the present invention provides a room module for use in combination with a building structure comprising: a support module; and one or more room modules, the or each room module being independently attachable to and cantilevered from the support module.

A further aspect of the present invention provides a support module for use in combination with a building structure comprising: a support module; and one or more room modules, the or each room module being independently attachable to and cantilevered from the support module.

Another aspect of the present invention provides a method of attaching a room module to a support module of a building structure comprising: a support module; and one or more room modules, the or each room module being independently attachable to and cantilevered from the support module, the method comprising the steps of: attaching one or more guide rails to the support module; locating the room module on the guide rail; driving the room module along the guide rail into engagement with the support module; and attaching the room module to the support module.

A further aspect of the present invention provides a method of removing a room module from a support module of a building structure comprising: a support module; and one or more room modules, the or each room module being independently attachable to and cantilevered from the support module, the method comprising the steps of: attaching one or more guide rails to the support module; locating the room module on the guide rail; detaching the room module from the support module; and driving the room module along the guide rail away from the support module.

In order that the present invention may be more readily understood, embodiments thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic sectional view through a building embodying the present invention;

Figure 2 is a schematic plan view of a foundation for use with the building of Figure 1;

Figure 3 is a schematic side view of the foundation of Figure 2;

Figure 4 is a schematic sectional view through a room module for use with the building of Figure 1;

Figure 4A is an enlarged detail of a portion of the room module of Figure 4;

Figure 5 is a schematic sectional view through a building embodying the present invention;

Figure 6 is a schematic plan view of a part of a building embodying the present invention;

Figure 7 is a plan view of the ground floor of the building of Figure 1;

Figure 8 is a plan view of the first floor of the building of Figure 1;

Figure 9 is a schematic plan view of a building embodying the present invention;

Figure 10 is a plan view of a plurality of buildings embodying the present invention arranged in a terrace configuration;

Figure 11 is a schematic plan view of a room module being fitted to a support module;

Figure 12 is a schematic sectional view of the arrangement of Figure 11;

Figure 13 is a schematic detail of a rack and pinion drive from Figure 12;

Figure 14 is a perspective view of an arrangement to enable the attachment of a room module to a support module;

Figure 15 is a schematic plan view of a support module attached to two room modules;

Figure 16 is a schematic sectional view of three room modules attached to respective support modules;

Figure 17 is a schematic sectional view through a building structure embodying the present invention; and

Figure 18 is a schematic sectional view through another building structure embodying the present invention.

Referring to Figure 1, a house 1 embodying the present invention comprises four basic components: a foundation 2 for providing a solid base and bearing the load of the building; two support modules 3 comprising the main load bearing elements of the building itself; a plurality of room modules 4 comprising the main living spaces in the building; and a roof structure 5.

Turning to Figures 2 and 3, the foundation 2 comprises two rectangular precast concrete foundation slabs 6 which when positioned as shown create a foundation 2 having voids 7 in each corner to create a central main portion 8 of cruciform configuration. The support module 3 sits on one arm 9 of the cruciform and the other arm 10 of the cruciform provides a stabilising function. The frames of the voids 7 in the foundation slabs also provide a stabilising function.

Precast concrete piles 11, for example, are driven into the ground either before the foundation slab 2 is positioned or through holes provided in the foundation slab 2 at each of the corners of the voids 7.

The support module comprises a chassis or frame defining a substantially cuboid volume. The chassis is preferably manufactured from steel but other conventional load bearing materials can be used. The chassis is created from a plurality of upright and horizontal members which may be cross braced if required. Joints between the members which make up the chassis are rigid. The support module has panels, some of which may be demountable, which provide the walls, floor and ceiling.

The wall panels are blank panels for walls of the support module which do not afford access to the outside and whatever room modules are attached to the support module. The wall panels which do afford access to the outside or to room modules have a door aperture therein.

The outer surfaces of the support module are fitted with attachment means to allow room modules to be attached thereto. In a preferred example, the attachment means on the support module comprises a series of spaced apart arrays of holes provided in a horizontally oriented chassis member toward the ceiling of the support module. A second set of such attachment means are provided along a horizontally oriented chassis member toward the floor of the support module. Each of the arrays of holes is suitable for co-operation with and attachment to a corresponding array of holes provided on a chassis of a room module, the position of attachment of the room module with respect to the support module also being variable by attaching the room module at different locations along the chassis member of the support module. It is

envisaged that either the position of the attachment means may be variable or that further attachment means may be provided intermediate or above or below the existing attachment means to allow flexibility of design.

In the present example, the building 1 includes two support modules 3 stacked on top of one another. These support modules 3, 3' may be assembled on-site, or off-site for delivery to the site. Access to the upper support module 3' is provided by a flight of stairs in the lower support module 3. Support modules may, however, be ganged together in a variety of configurations, thereby allowing a number of possible different floor plans for a building.

Although the support module 3 is described here as defining a substantially cuboid volume, the support module 3 may also be planar, having substantially no volume and being, for example, a supporting wall or face.

As previously explained, a plurality of room modules 4 are attachable to each of the support modules 3. These room modules 4 may be assembled on-site, or off-site for delivery to the site. Referring to Figure 4, an exemplary room module 4 comprises a steel chassis 12 defining a substantially cuboid volume. The chassis is constructed from a plurality of upper and lower members connected rigidly by upright members but not braced by diagonal members, the rigidity of the chassis being secured by rigidity at the chassis joints.

Panels are provided between the structural members of the chassis 12 to provide side walls 13, a floor 14 and a ceiling 15, thereby enclosing the substantially cuboid volume and creating a room. In the example, each of the outer sides of the panels is covered by a single steel sheet 16. The sheet 16 is attached along each of its free edges to a respective structural member of the chassis 12. To increase the rigidity of the structure and to facilitate attachment

of the sheet 16 to the side walls 13, the floor 14 and the ceiling 15, a fold 16A of each sheet 16 covering a panel extends inwardly between each structural member of the chassis 12 and the adjacent panel. The fold 16A is shown in detail in Figure 4A. The panels can be formed from any appropriate material or combination of materials, for example steel, glass, timber or plasterboard.

Since the room module 4 is constructed as a series of unbraced frames there is no need for cross bracing (although cross bracing may be provided if required), and therefore the walls 13 of the room module 4 are free from structural obstructions and doors and windows can be located where desired. Appropriate apertures are provided in the panels at the locations of doors and windows. As an alternative to a room module having a chassis or some other framework, it is envisaged that the room module may be manufactured from a number of panels which, when linked, provide structural stability to the room module.

One end of each room module 4 is suitable for attachment to a support module 3. The room module chassis 12 has attachment means to co-operate with the corresponding attachment means provided on the chassis of the support module 3. Preferably, the chassis carries four plates, one in each corner of the room module at the end for attachment to the support module. Referring to Figure 14, each of the plates has a 2x1 matrix of holes 22 therein which can be aligned with the holes 23, 23A formed in the chassis of the support module. The room module 4 can therefore be docked with the support module 3 and attached thereto by locking bolts passing through the co-operating holes 22, 23(A). This arrangement is also shown schematically in Figure 1 by the attachment means identified by reference numerals 17.

The room modules 4 are therefore independently attached to the support modules 3. Importantly, the room modules 4 are cantilevered from the support modules 3. Additionally, each room module is spaced apart from its horizontally or vertically neighbouring room module. Further, the room modules 4 on the ground floor are spaced apart from the foundation 2. Thus, each of the room modules 4 is entirely independent of the other room modules 4.

The room modules 4 may, however, be combined with one another, and the wall, floor or ceiling panels removed where the room modules 4 adjoin to create a single large room. Room modules 4 combined in this manner would still be independently removable, and would not be supported by one another. If preferred, not all of each panel need be removed so that, for example, only a doorway between the two room modules 4 may be provided.

In the example of Figures 1 and 5, The roof structure 5 is envisaged as a plurality of 'volumetric' modules in the form of either a flat roof as in Figure 5 or a pitched roof as shown in Figure 1. The roof size, design, configuration and finish can take a number of diverse forms which, apart from affording protection from the weather if required, can be in keeping with the surroundings or which can add to the aesthetic appeal of the building. The roof structure 5 is supported solely by the support module 3' and spans over the room modules cantilevered from either side of the support modules so as to provide cover and protection therefor. Importantly, the room modules 4 on the top floor of the building 1 adjacent the roof structure 5 are spaced apart from the roof structure 5.

If the design of the roof allows, as does the pitched roof in the example of Figure 1, it is possible to house a further room module 4 in the roof structure 5.

Whilst the roof structure 5 can provide a certain amount of protection from weather, more protection may be required especially if the building is not located in a temperate climate. Turning to Figure 5, in this example a cladding or 'rainscreen' material 18 is provided around the building, in particular the room modules 4. In a similar manner to the roof structure 5 the cladding can again take a number of diverse forms which can be in keeping with the surroundings or which can add to the aesthetic appeal of the building. For example, the cladding 18 can be, as shown in Figure 5, a plurality of demountable panels which are bolted each other, to the foundation 2, to the roof structure 5 and to the room modules 4. The panels may be of glass, timber, metal or any other suitable form of protective or aesthetic cladding. In the example, the cladding 18 is supported by the foundation 2, which extends sufficiently far from the support module 3 to do so.

It should be noted that the cladding 18 need not assist in the supporting of the room modules 4 which are cantilevered from and fully supported by the support modules 3. The securing, preferably by bolting, of the cladding 18 to the room modules 4 may, however, serve to transmit wind loads experienced by the cladding 18 back to the load bearing support modules 3. This arrangement also ensures that any apertures on the outward facing sides of the room modules 4 are aligned with corresponding apertures formed in the cladding 18.

It is recognised that an external framework comprising the cladding or in addition to the cladding could be provided to give additional support to the free end of each room module. The room modules would then be provided as a propped cantilever structure from the support module. As an example, this may be desirable when the 'live' load of a room module (i.e. when it is in use by the

inhabitants of the building) is likely to be significantly greater than the 'dead' load of the room module.

Figure 6 shows an embodiment of the building which comprises a single support module 3, a room module 4 and a spacer module 19. The spacer module 19 is simply a cross-braced framework which can be used to fill 'voids' in the building thereby maintaining the desired line of the cladding, while providing a structure to transfer any wind loads back to the support module 3.

It is envisaged that the support modules will provide the principal route for all the services in the building to the room modules. The services would include (but are not limited to) water, gas, electricity, telecommunications, air-conditioning, heating ducts or central heating, vacuum pressure, computer network cabling and video and audio feeds. The services are hidden behind the demountable wall panels and in the voids between any adjoining modules. Preferably, the services will be available to each room module attachable to a support module, services on the support module being connectable to co-operating services on a room module. Further, it is envisaged that the incoming services will be provided to the building through the support module 3. For example, the supplies of electricity, water or gas would be located in or connected to the ground floor support module 3.

Buildings embodying the present invention particularly lend themselves to being readily and quickly constructed with little skill being required during final assembly on site. It is envisaged that all of the modules comprising a building will be able to be bought as stand alone items from separate, specialist suppliers. Each of the room modules is intended to be a fully finished room having the appropriate fixtures and fittings such as power points, light fittings,

windows, doors, kitchen units, bathroom suites, toilets, sinks and the like and also incorporating furniture where appropriate.

Thus, referring to the specific example shown in Figures 7 and 8, one could purchase two support modules 3, a kitchen room module 4, a living room module 4, a dining room module 4, three bedroom room modules 4, and a bathroom room module 4 all directly from separate, specialist suppliers to construct a basic three bedroom house. Assuming that a foundation 2 is in place, the building is readily assembled by bolting the room modules to the support modules. An appropriate roof structure and cladding could then be added if desired. In temperate regions, only a minimal, if any, roof structure and cladding may be required.

If the homeowner could not afford or did not need two of the bedrooms, for example bedrooms 2 and 3, then the homeowner could purchase a single spacer module 19 to take the place of the two bedroom room modules 4. When the home owner can afford or requires further bedrooms, then, since the spacer module 19 is independently cantilevered from the support module 3, it can simply be removed and replaced by two bedroom room modules. Thus, the building is so adaptable that the occupier of a house embodying the invention can simply decide to add, remove or rearrange rooms as and when required. Similarly, if the bathroom is to be upgraded, then it is envisaged that the old bathroom room module would simply be exchanged for a higher specification version.

If a further floor is required to the building, then a further support module 3 can be purchased, the roof structure 5 removed and the new support module 3 stacked on the existing support modules 3. Additional room modules 4 can then be attached to the new storey and the roof structure 5 replaced. One could

even envisage room modules on one side of a building being exchanged with those on the other side of the building simply to change the aspect of a particular room.

Thus, it can be appreciated that housing embodying the present invention can be designed to meet the needs of a variety of households and be readily capable of conversion or expansion.

Figure 9 shows a plan view of one floor of another building embodying the invention. In this example, the support module 3 is octagonal in form. Of course, other polygonal room or support modules may be used.

Figure 10 shows a way in which houses embodying the invention can be aligned with one another, so as to provide a terrace of buildings, by aligning the support modules 3 of the respective buildings adjacent to one another.

It is clearly desirable to remove or insert room modules 4 in an existing building without disturbing or requiring the removal of either horizontally or vertically adjacent room modules. It is envisaged that buildings embodying the present invention will incorporate room modules which are spaced apart from one another, the roof structure and the foundation so as to be easily and independently removable. A particularly preferred method of attaching a room module 4 to (or removing from) a support module is shown in Figures 11 to 13. A pair of rigid steel rails 20 each fitted with an orthogonally arranged plate 21 at one end are provided. The plates are similar to those found at the attachment end of a room module 4. Each rail 20 is attached by its plate 21 to the support module 4 at a position immediately above the intended site of one of the upper corners of the room module 4 to be attached. Figure 14 schematically shows the attachment holes 23 provided for the plates 21 on the support module 3.

The row of arrays of holes 23 are intended to be locked to corresponding attachment means provided on the top corners of the room modules 4. The row of arrays of holes 23A at the base of the support module 3 are intended to be locked to corresponding attachment means provided on the bottom corners of the room modules 4.

When in position, the rails 20 extend past the line 18A of the cladding 18 so as to allow a room module to be held under the rails 20 outside the perimeter of the building.

A room module is connected to the rails, and a crane or other convenient lifting means is attached to the rails and used to lift the room module 4. Preferably, as shown in Figure 13, the rails 20 carry a rack 24 and the four ceiling corners of the room module 4 are each connected to a pinion wheel 25. The pinion wheels 25 on the corners of the room module are held by the racks 24 so as to allow the room module 4, attached to the pinion wheels 25 by vertical supports 28, to be driven along underneath the rails 20 toward the support module 3 in a controlled manner by the rack and pinion drive. The driving force to turn the pinion wheels 25 is provided by respective individual motors 29 which each drive a respective pinion wheel 25 and are mounted thereto. The room module 4 can therefore be presented to the support module 3 with the attachment plates on the room module aligning with their respective arrays of holes 23, 23A on the support module 3 for locking thereto. Once the room module 4 has been secured to the support module 3, the rails 20 can be released from the support module 3 and removed by the crane.

For added strength and rigidity, the rails may be cross-braced near the end furthest from the support module by a pair of hinged diagonal struts 26, as

shown in Figure 11, which allow the pair of rails to be spaced apart by a desired distance equivalent to the width of the relevant room module 4.

In a preferred embodiment of the method of attaching a room module 4, the rails 20 are first located on the pinion wheels 25 and the entire assembly of rails 20 and room module 4 is craned into position to allow the rails 20 to be attached to the support module 3 for subsequent presentation of the room module 4 to the support module 3. This method removes the need for the room module 4 to be engaged with the rails 20 when the rails 20 are already secured to the support module.

It is however recognised that, when constructing a new building and given sufficient access, it could be advantageous to present the room module 4 to the support module 3 using traditional lifting methods such as (but not limited to) a crane 27 or forklift truck.

Since the room modules 4 are spaced apart from one another, both vertically and horizontally, from the roof structure 5 and from the foundation 2, the above described method can be used to remove or add room modules 4 irrespective of their location around the support module 3. Room modules 4 can thus be added or removed in any order as the room modules are entirely independent of one another.

Figure 14 shows room modules 4 attached to the chassis of a support module 3. The horizontal members at the top and bottom of the chassis of the support module 3 contain rows of arrays of holes 23, 23A as previously mentioned. Securing elements 32 are connected to or form part of the corners of the upper and lower members of the chassis of the room modules 4. Each securing element 32 comprises two plates secured together at right angles to one another

and braced by triangular plates. The securing elements 32 present the face of one of the plates to the chassis of the adjacent support module 3, which plate contains the 2x1 array of holes 22. The room module 4 is attached to the support module 3 by a bolt passing through each of the 2x1 array of holes 22 and through one of the holes 23, 23A in the chassis 12 of the support module 3.

Figure 15 shows a plan view of two room modules 4 attached to a support module 3 in the manner described in relation to Figure 14. Co-operating apertures in the wall and surrounding panels of the support module and the adjacent wall of the room module provide a doorway between the support module 3 and the room module 4. Cover plates 30 are provided to line the doorway, bridging the space between the room module 4 and the support module 3. The room module 4 is provided with a door 31 which is attached with hinges to the door frame to open inwards into the room module 4.

Figure 16 shows a sectional view of three support modules 3 stacked on top of one another. Room modules are attached to the right hand side of each of the support modules 3 in the manner described above, with securing elements 32 fixing the chassis of the room modules 4 to those of the support modules 3.

The envelope may also have additional properties such as thermal and acoustic properties which would depend on the type of building and its location. It is envisaged that the cladding may be spaced apart from the room modules, to create an enclosed space around the room modules, as shown in Figures 17 and 18. For example, this configuration could be suitable for prisons, where the room modules 4 could form individual cells and the enclosed space formed by the cladding 18 would be a secure, enclosed area in which prisoners and staff could circulate. More than one gang of support modules 3, each carrying several 'cell' room modules, could be enclosed within the same envelope. It is

also envisaged that there would be sufficient space within the cladding structure to allow room modules 4 to be added or removed within the cladding structure without needing the cladding structure to be dismantled if so desired.

Figures 17 and 18 show two configurations of a prison layout. Figure 17 involves a single cladding enveloping two gangs of support modules 3, each with their own room modules 4. Sufficient space is provided within the cladding to remove any of the room modules 4 into the central space between the two pairs of structures, and a room module 4 is shown in phantom to demonstrate this. Figure 18 shows a prison layout in which the cladding 18 only surrounds one support module 3, but extends beyond the edge of the room modules attached thereto to provide a sizeable enclosed space. In this example, the cladding would need to be removed if a room module 4 is to be extracted from within the cladding.

Thus, buildings embodying the invention are extremely versatile having a flexible size, design and configuration. Further, such buildings have rooms which are replaceable and can therefore be readily upgraded to a higher specification or their functionality changed. Buildings embodying the invention present an entirely new concept in the supply and production of buildings, allowing the basic building parts to be readily sourced and easily constructed in a modular manner without the need to involve many different tradesmen and skilled labourers on-site in the production of a building.

It is to be appreciated that the claimed invention is not limited in its application to residential housing but is equally applicable to other building structures such as hospitals, hotels, offices, shops and the like.

CLAIMS:

1. A building structure comprising:
a support module; and
a plurality of room modules, each room module being independently attachable to and cantilevered from the support module.
2. A building structure according to Claim 1, wherein the support module supports one room module above another, the room modules being vertically spaced apart from one another.
3. A building structure according to Claim 1 or 2, wherein the support module supports one room module adjacent another, the room modules being horizontally spaced apart from one another.
4. A building structure according to any preceding claim, wherein each room module is spaced apart from the or each adjoining room module.
5. A building structure according to any preceding claim, wherein a cladding is provided around the building structure.
6. A building structure according to any preceding claim, wherein a frame structure comprising or in addition to the cladding provides additional support for some or all of the room modules.
7. A building structure according to Claim 5 or 6, wherein the cladding is attached to and supported by a foundation.

8. A building structure according to any preceding claim, wherein the foundation is formed from more than one element.
9. A building structure according to any one of Claims 5 to 8, wherein the cladding is attached to and supported by a roof structure.
10. A building structure according to any one of Claims 5 to 9, wherein the cladding is attached to and supported by at least one room module.
11. A building structure according to any one of Claims 5 to 10, wherein the cladding comprises a plurality of demountable panels.
12. A building structure according to any preceding claim, wherein the support module supports a roof structure which covers the support module and each room module, the roof structure being spaced apart from the or each adjoining room module.
13. A building structure according to Claim 12, wherein the roof structure includes a room module.
14. A building structure according to any preceding claim, wherein a foundation structure underlies the support module, the foundation structure being spaced apart from the or each adjoining room module.
15. A building structure according to Claim 14, wherein the foundation structure has a main portion upon which the support module sits and one or more stabilising portions extending from the main portion.

16. A building structure according to Claim 15, wherein the main portion is a foundation slab.
17. A building structure according to Claim 16, wherein the or each stabilising portion underlies one or more room modules and is spaced apart from the or each adjoining room module.
18. A building structure according to Claim 17, wherein the stabilising portion comprises a frame of foundation material having an outer perimeter, the centre of the frame being a void.
19. A building structure according to any one of Claims 14 to 18, wherein the foundation structure is manufactured as a precast concrete structure.
20. A building structure according to any one of Claims 14 to 19, wherein one or more piles extend from the foundation structure into the underlying ground.
21. A building structure according to any preceding claim, wherein a room module is formed from panels which are linked together without a supporting frame.
22. A building structure according to any one of Claims 1 to 20, wherein a room module comprises a chassis defining a volume, the chassis having attachment means to co-operate with corresponding attachment means provided on a chassis of the support module.
23. A building structure according to Claim 22, wherein panels are provided between the members of the chassis to provide side walls, a floor and a ceiling.

24. A building structure according to Claim 22 or 23, wherein the chassis is constructed from one or more upper and lower members connected rigidly by upright members but not braced by diagonal members, the rigidity of the chassis being secured by rigidity at the chassis joints.

25. A building structure according to any preceding claim, wherein a room module includes one or more internal partitions to define one or more rooms in each room module.

26. A building structure according to any preceding claim, wherein a room module includes at least one door aperture.

27. A building structure according to any preceding claim, wherein a room module includes at least one window aperture.

28. A building structure according to any preceding claim, wherein the support module comprises a load bearing chassis having attachment means to co-operate with corresponding attachment means provided on a chassis of a room module.

29. A building structure according to Claim 28, wherein the attachment means on the support module comprises a longitudinal array of spaced apart attachment locations provided along a chassis member of the support module, each of which attachment locations is suitable for co-operation with and attachment to corresponding attachment means provided on a chassis of a room module, the position of attachment of the room module with respect to the support module being variable by attaching the room module at different locations along the chassis member of the support module.

30. A building structure according to any one of Claims 22, 28 or 29, wherein the attachment means comprise a plurality of holes formed in the chassis of the support module and the room module, the holes being alignable to receive therethrough a locking bolt to secure the room module to the support module.

31. A building structure according to any preceding claim, wherein the support module includes a circulation passage having access to each room module attached thereto.

32. A building structure according to any preceding claim, wherein a further support module is attachable on top of the support module to provide a further storey to the building structure.

33. A building structure according to any preceding claim, wherein a further support module is attachable adjacent the support module to provide a plurality of support members in side by side engagement.

34. A building structure according to any preceding claim, wherein the building structure has a plurality of storeys and a single support module from which the room modules are cantilevered.

35. A building structure according to any preceding claim, wherein the services for the building are principally routed through the support module, thereby facilitating the connection of services to each room module attached to or attachable to the support module.

36. A building structure according to Claim 35, wherein each room module has services fitted in preparation for connection to corresponding services on the support module.

37. A building structure according to any preceding claim, wherein the or each support module has demountable wall panels, the wall panels being blank panels for walls of the support module which do not require an aperture therein and wall panels having an aperture therein for walls of the support module which do require an aperture therein, an aperture in a wall panel of the support module being alignable with an aperture in a wall panel of a room module.

38. A room module for use in combination with a building structure of any preceding claim, the room module having at least basic fixtures and fittings incorporated therein.

39. A support module for use in combination with a building structure of any preceding claim.

40. A method of building a building structure comprising the steps of:
presenting a plurality of room modules for independent cantilevered attachment to a support module; and
attaching each room module to the support module for support thereby.

41. A method of attaching a room module to a support module of a building structure comprising: a support module; and one or more room modules, the or each room module being independently attachable to and cantilevered from the support module, the method comprising the steps of:

attaching one or more guide rails to the support module;
locating the room module on the guide rail;

driving the room module along the guide rail into engagement with the support module; and

attaching the room module to the support module.

42. A method of removing a room module from a support module of a building structure comprising: a support module; and one or more room modules, the or each room module being independently attachable to and cantilevered from the support module, the method comprising the steps of:

attaching one or more guide rails to the support module;

locating the room module on the guide rail;

detaching the room module from the support module; and

driving the room module along the guide rail away from the support module.

43. A building structure substantially as hereinbefore described with reference to and as shown in the accompanying representations.

AMENDED CLAIMS

[received by the International Bureau on 10 November 2000 (10.11.00); original claims 1-43 replaced by new claims 1-42 (7 pages)]

1. A building structure comprising:
a support module; and
a plurality of enclosed room modules, each room module being independently attachable to and cantilevered from the support module.
2. A building structure according to Claim 1, wherein the support module supports one room module adjacent another, the room modules being horizontally spaced apart from one another.
3. A building structure according to any preceding claim, wherein each room module is spaced apart from the or each adjoining room module.
4. A building structure according to any preceding claim, wherein a cladding is provided around the building structure.
5. A building structure according to any preceding claim, wherein a frame structure comprising or in addition to the cladding provides additional support for some or all of the room modules.
6. A building structure according to Claim 4 or 5, wherein the cladding is attached to and supported by a foundation.
7. A building structure according to any preceding claim, wherein the foundation is formed from more than one element.
8. A building structure according to any one of Claims 4 to 7, wherein the cladding is attached to and supported by a roof structure.

9. A building structure according to any one of Claims 4 to 8, wherein the cladding is attached to and supported by at least one room module.
10. A building structure according to any one of Claims 4 to 9, wherein the cladding comprises a plurality of demountable panels.
11. A building structure according to any preceding claim, wherein the support module supports a roof structure which covers the support module and each room module, the roof structure being spaced apart from the or each adjoining room module.
12. A building structure according to Claim 11, wherein the roof structure includes a room module.
13. A building structure according to any preceding claim, wherein a foundation structure underlies the support module, the foundation structure being spaced apart from the or each adjoining room module.
14. A building structure according to Claim 13, wherein the foundation structure has a main portion upon which the support module sits and one or more stabilising portions extending from the main portion.
15. A building structure according to Claim 14, wherein the main portion is a foundation slab.
16. A building structure according to Claim 15, wherein the or each stabilising portion underlies one or more room modules and is spaced apart from the or each adjoining room module.

17. A building structure according to Claim 16, wherein the stabilising portion comprises a frame of foundation material having an outer perimeter, the centre of the frame being a void.

18. A building structure according to any one of Claims 13 to 17, wherein the foundation structure is manufactured as a precast concrete structure.

19. A building structure according to any one of Claims 13 to 18, wherein one or more piles extend from the foundation structure into the underlying ground.

20. A building structure according to any preceding claim, wherein a room module is formed from panels which are linked together without a supporting frame.

21. A building structure according to any one of Claims 1 to 19, wherein a room module comprises a chassis defining a volume, the chassis having attachment means to co-operate with corresponding attachment means provided on a chassis of the support module.

22. A building structure according to Claim 21, wherein panels are provided between the members of the chassis to provide side walls, a floor and a ceiling.

23. A building structure according to Claim 21 or 22, wherein the chassis is constructed from one or more upper and lower members connected rigidly by upright members but not braced by diagonal members, the rigidity of the chassis being secured by rigidity at the chassis joints.

24. A building structure according to any preceding claim, wherein a room module includes one or more internal partitions to define one or more rooms in each room module.
25. A building structure according to any preceding claim, wherein a room module includes at least one door aperture.
26. A building structure according to any preceding claim, wherein a room module includes at least one window aperture.
27. A building structure according to any preceding claim, wherein the support module comprises a load bearing chassis having attachment means to co-operate with corresponding attachment means provided on a chassis of a room module.
28. A building structure according to Claim 27, wherein the attachment means on the support module comprises a longitudinal array of spaced apart attachment locations provided along a chassis member of the support module, each of which attachment locations is suitable for co-operation with and attachment to corresponding attachment means provided on a chassis of a room module, the position of attachment of the room module with respect to the support module being variable by attaching the room module at different locations along the chassis member of the support module.
29. A building structure according to any one of Claims 21, 27 or 28, wherein the attachment means comprise a plurality of holes formed in the chassis of the support module and the room module, the holes being alignable to receive therethrough a locking bolt to secure the room module to the support module.

30. A building structure according to any preceding claim, wherein the support module includes a circulation passage having access to each room module attached thereto.

31. A building structure according to any preceding claim, wherein a further support module is attachable on top of the support module to provide a further storey to the building structure.

32. A building structure according to any preceding claim, wherein a further support module is attachable adjacent the support module to provide a plurality of support members in side by side engagement.

33. A building structure according to any preceding claim, wherein the services for the building are principally routed through the support module, thereby facilitating the connection of services to each room module attached to or attachable to the support module.

34. A building structure according to Claim 33, wherein each room module has services fitted in preparation for connection to corresponding services on the support module.

35. A building structure according to any preceding claim, wherein the or each support module has demountable wall panels, the wall panels being blank panels for walls of the support module which do not require an aperture therein and wall panels having an aperture therein for walls of the support module which do require an aperture therein, an aperture in a wall panel of the support module being alignable with an aperture in a wall panel of a room module.

36. A room module for use in combination with a building structure of any preceding claim, the room module having at least basic fixtures and fittings incorporated therein.

37. A support module for use in combination with a building structure of any preceding claim.

38. A method of building a building structure comprising the steps of:
presenting a plurality of enclosed room modules for independent cantilevered attachment to a support module; and
attaching each room module to the support module for support thereby.

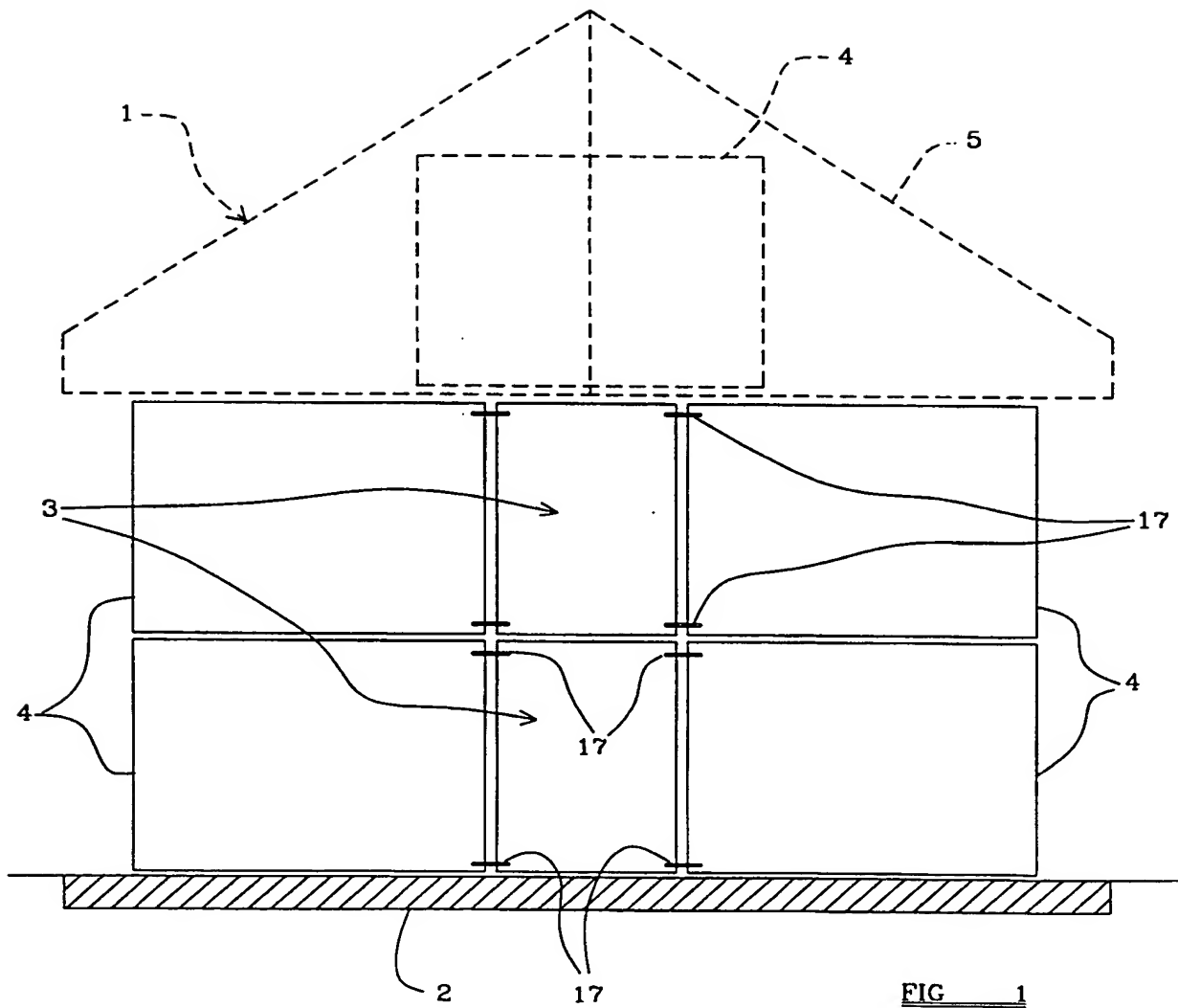
39. A method of attaching a room module to a support module of a building structure comprising: a support module; and one or more room modules, the or each room module being independently attachable to and cantilevered from the support module, the method comprising the steps of:
attaching one or more guide rails to the support module;
locating the room module on the guide rail;
driving the room module along the guide rail into engagement with the support module; and
attaching the room module to the support module.

40. A method of removing a room module from a support module of a building structure comprising: a support module; and one or more room modules, the or each room module being independently attachable to and cantilevered from the support module, the method comprising the steps of:
attaching one or more guide rails to the support module;
locating the room module on the guide rail;
detaching the room module from the support module; and

driving the room module along the guide rail away from the support module.

41. A kit for building a building structure, comprising:
 - a support module; and
 - a plurality of enclosed room modules, each room module being independently attachable to the support module such that it is cantilevered therefrom.
42. A building structure substantially as hereinbefore described with reference to and as shown in the accompanying representations.

1 / 13





2 / 13

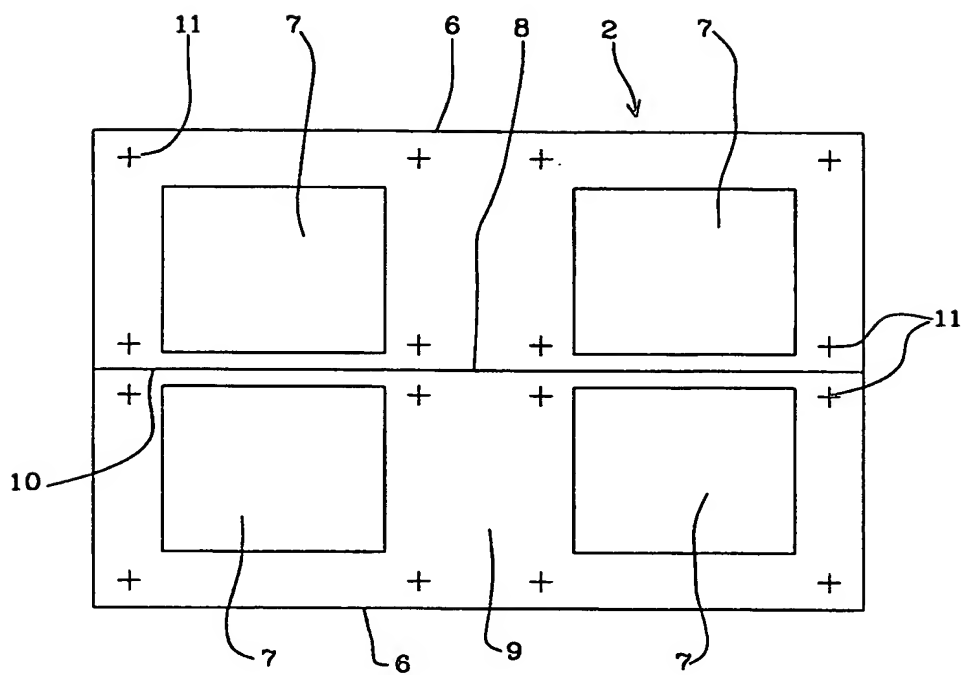


FIG 2

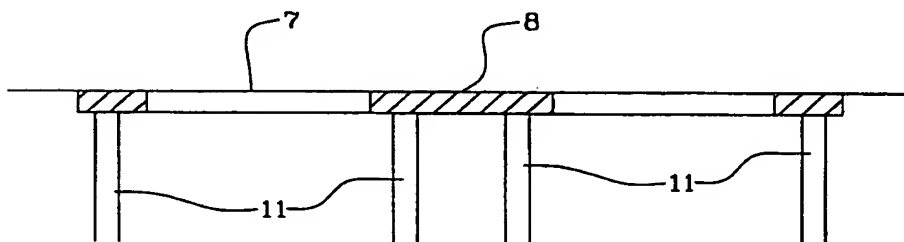
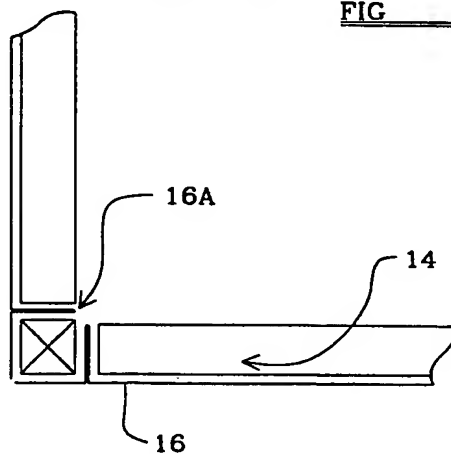
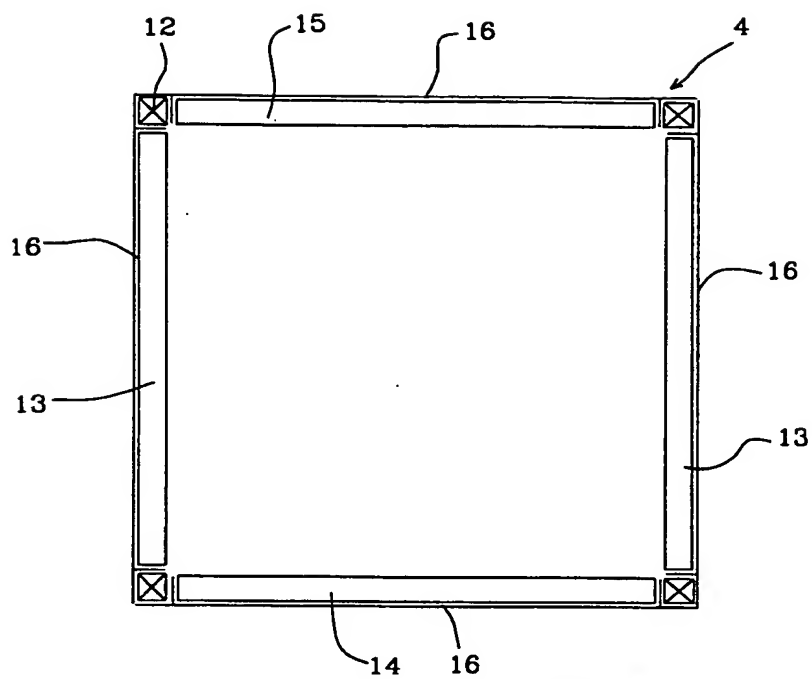
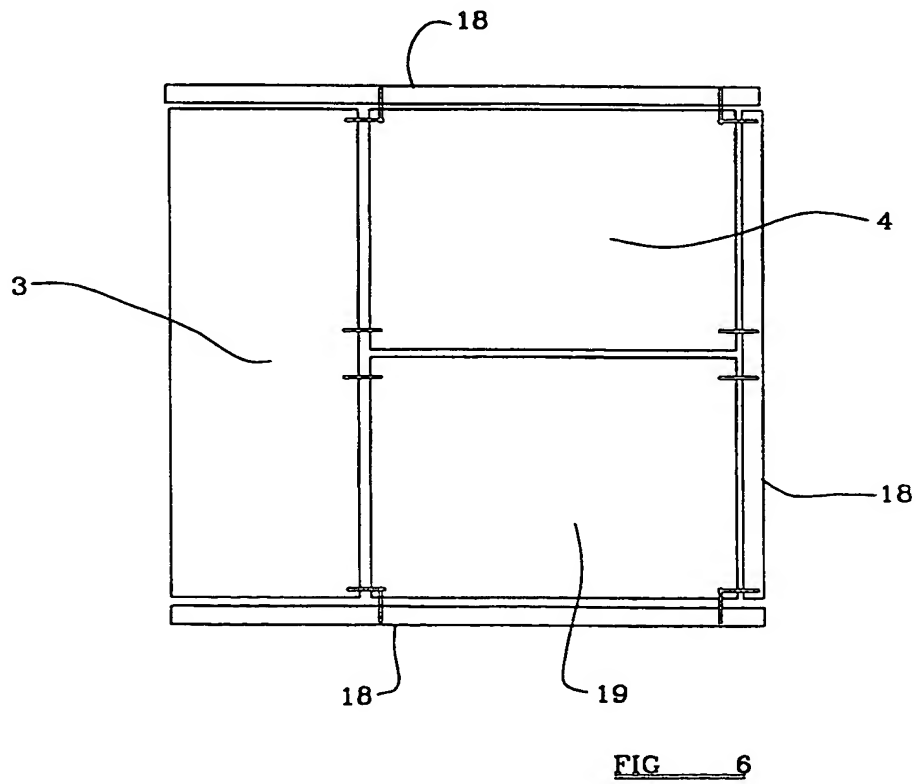
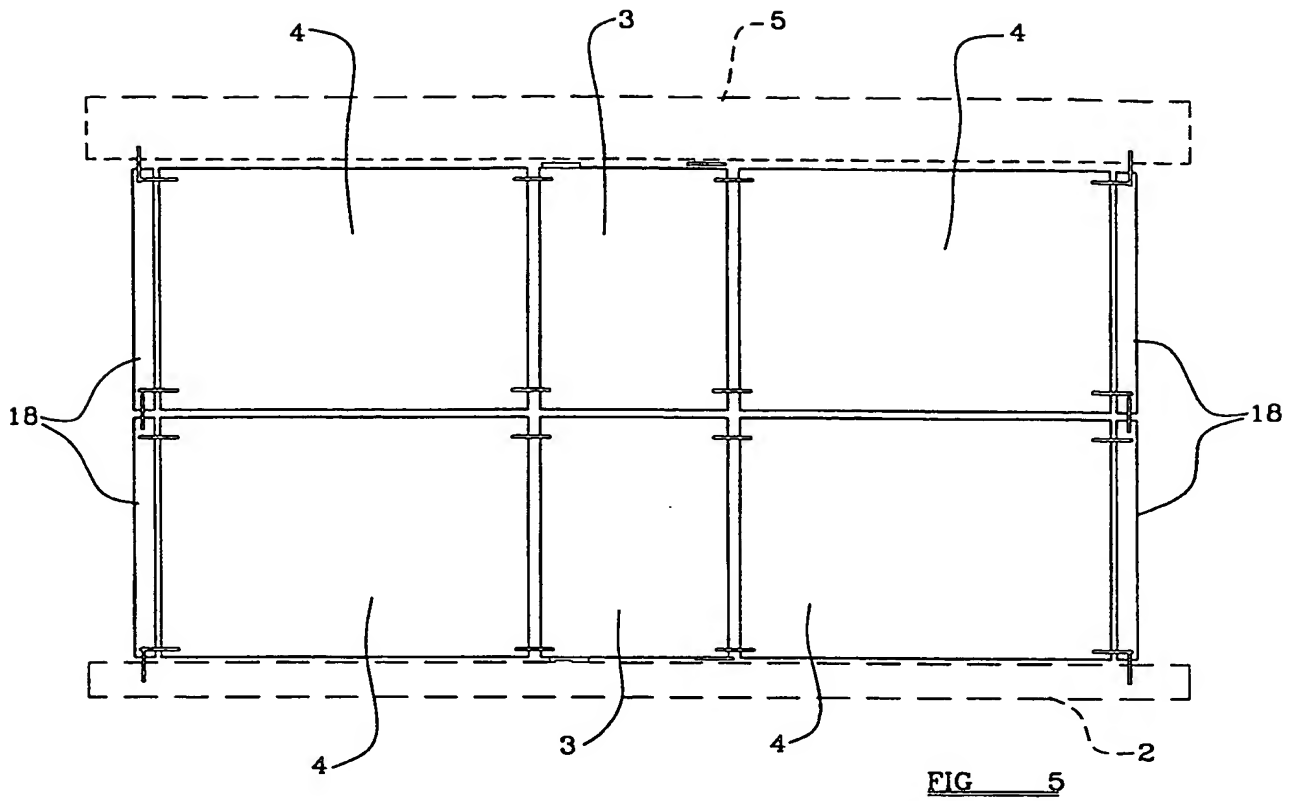


FIG 3

3 / 13



4 / 13



5 / 13

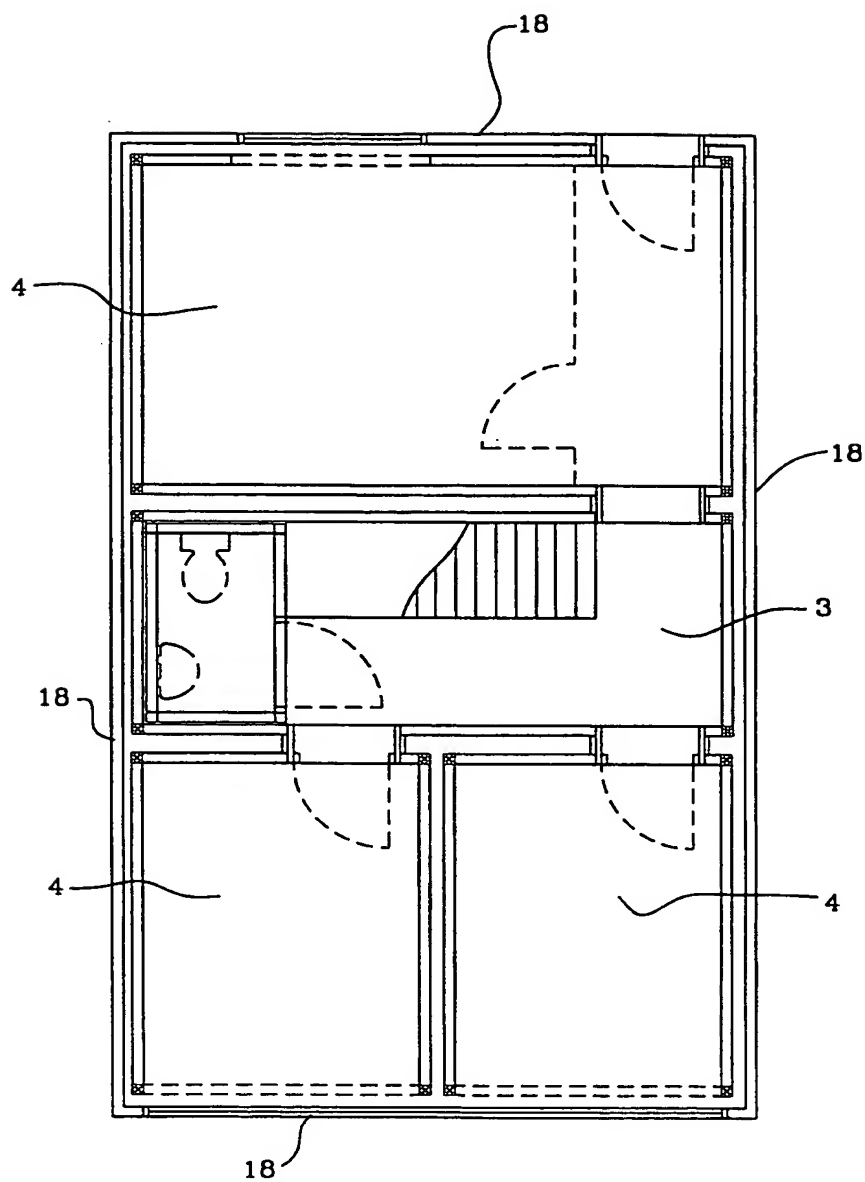


FIG 7

6 / 13

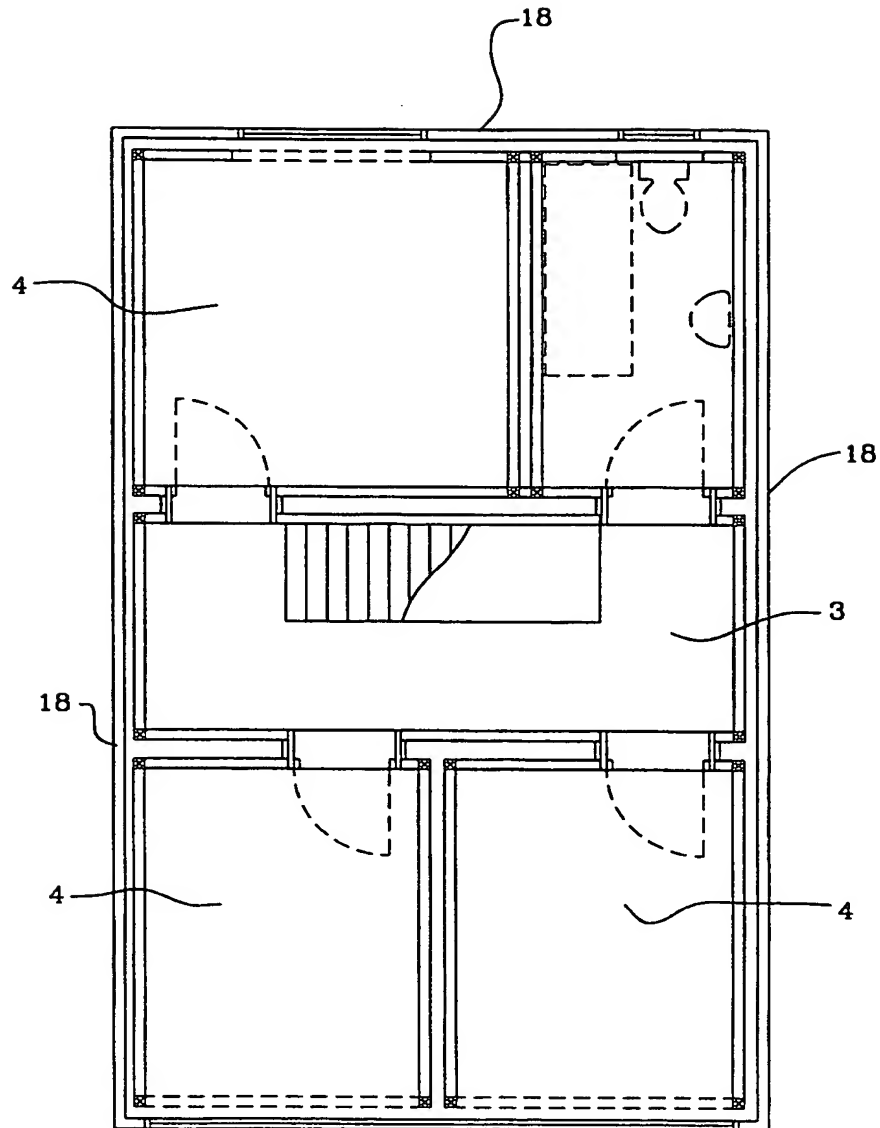


FIG. 8

7 / 13

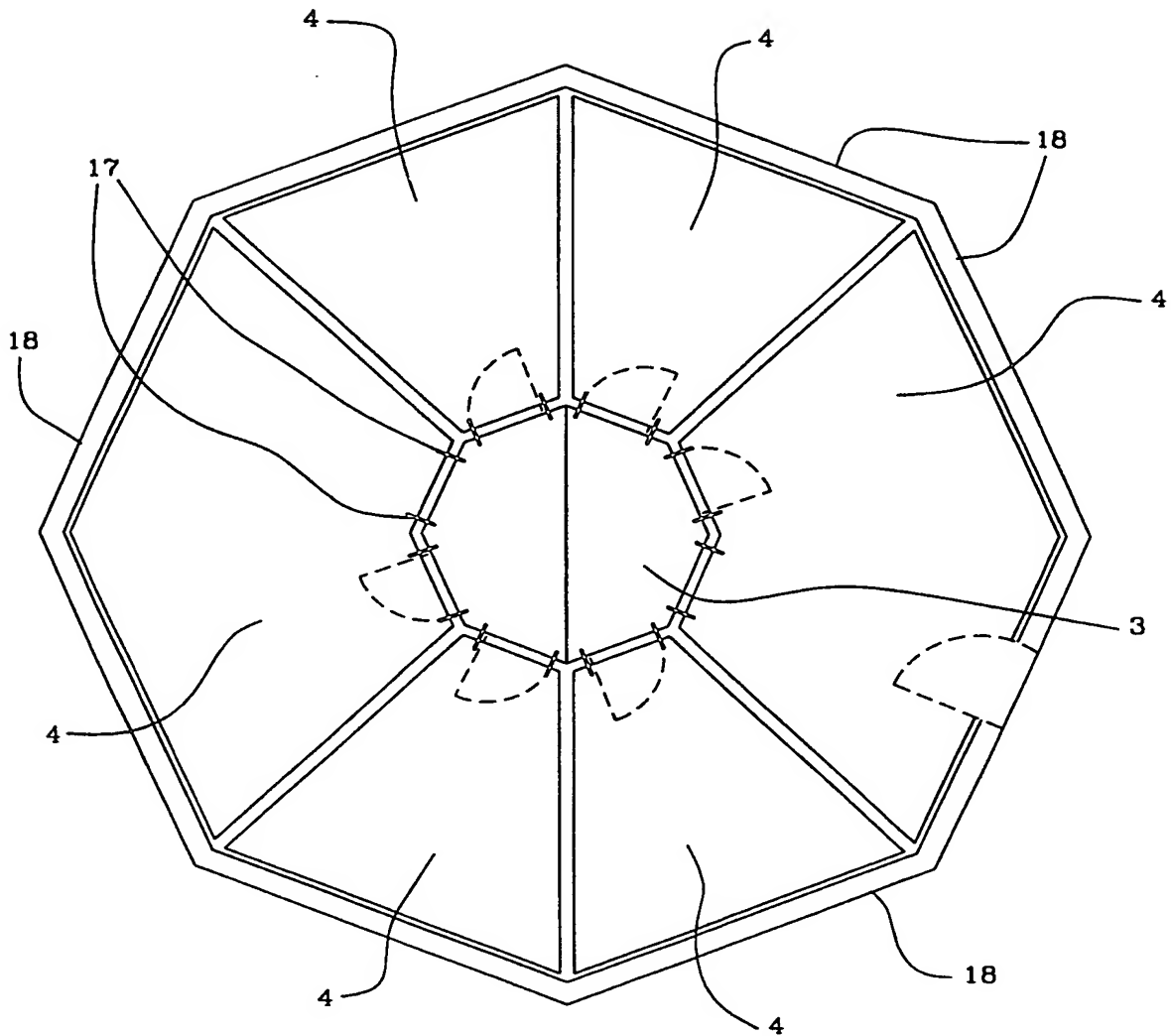
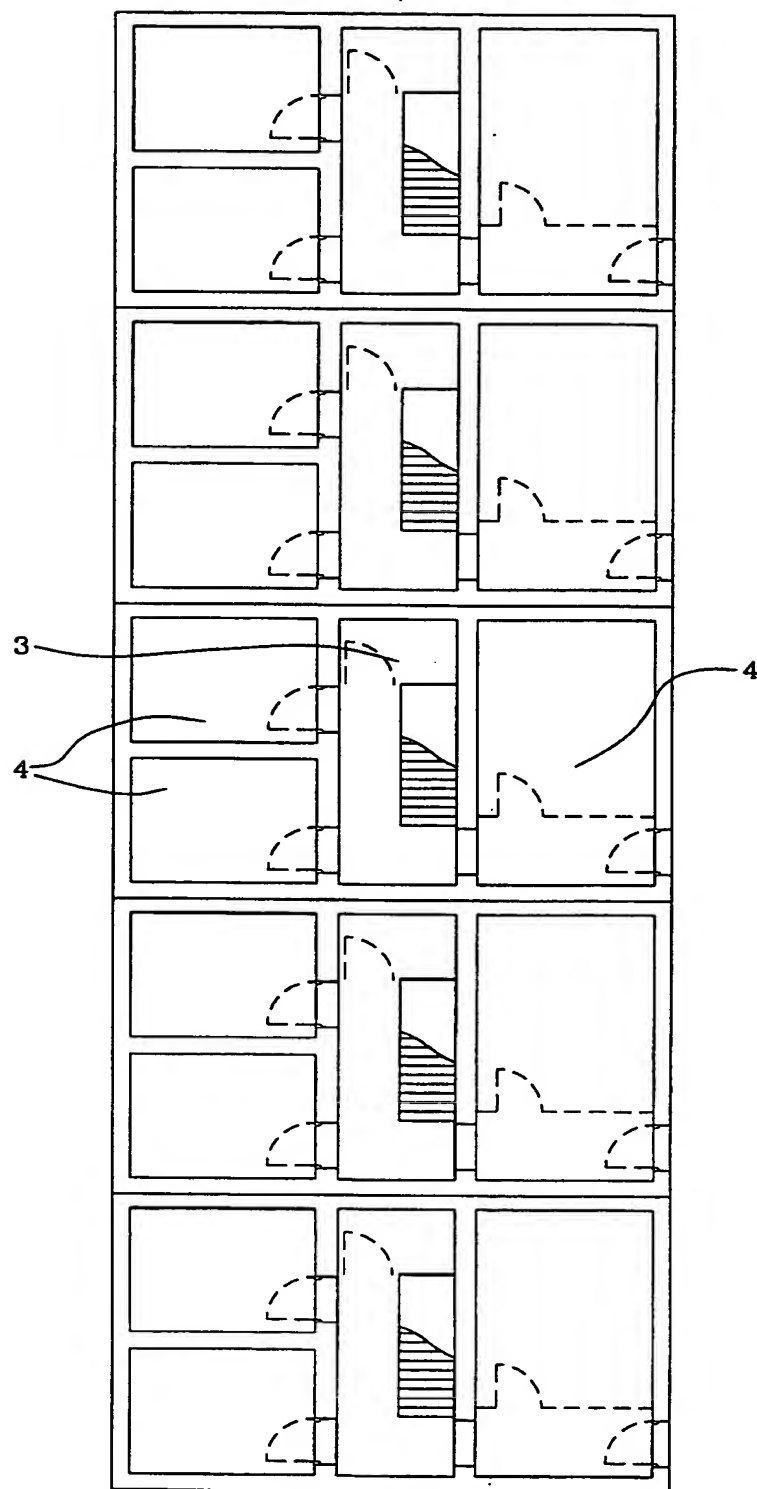


FIG 9

8 / 13

FIG 10



9 / 13

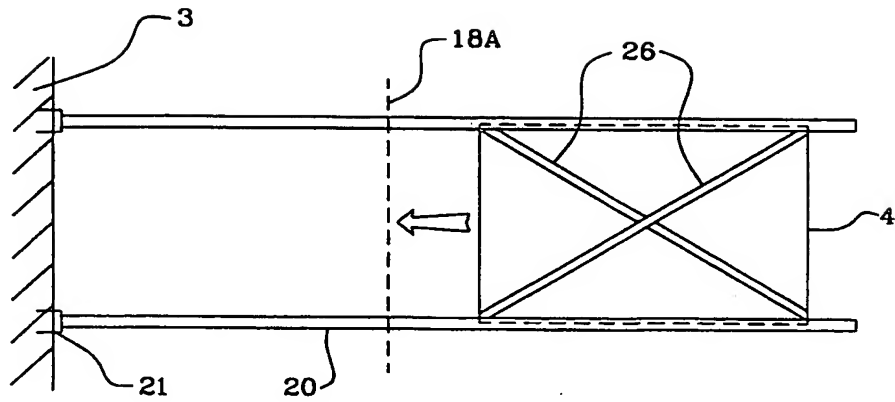


FIG 11

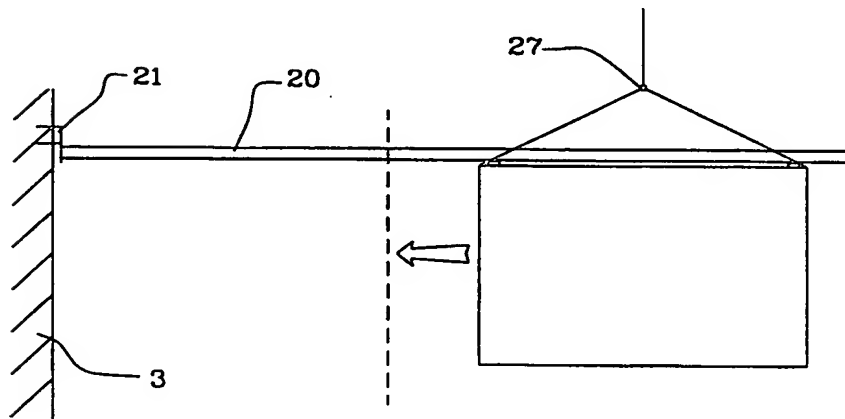


FIG 12

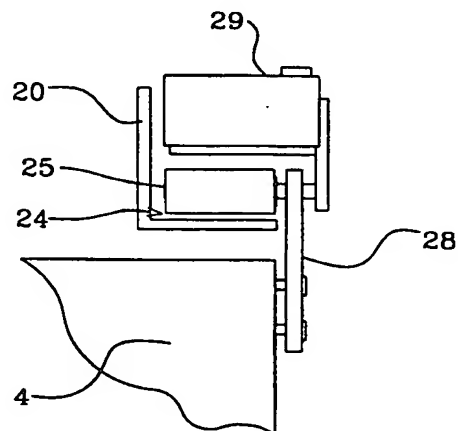
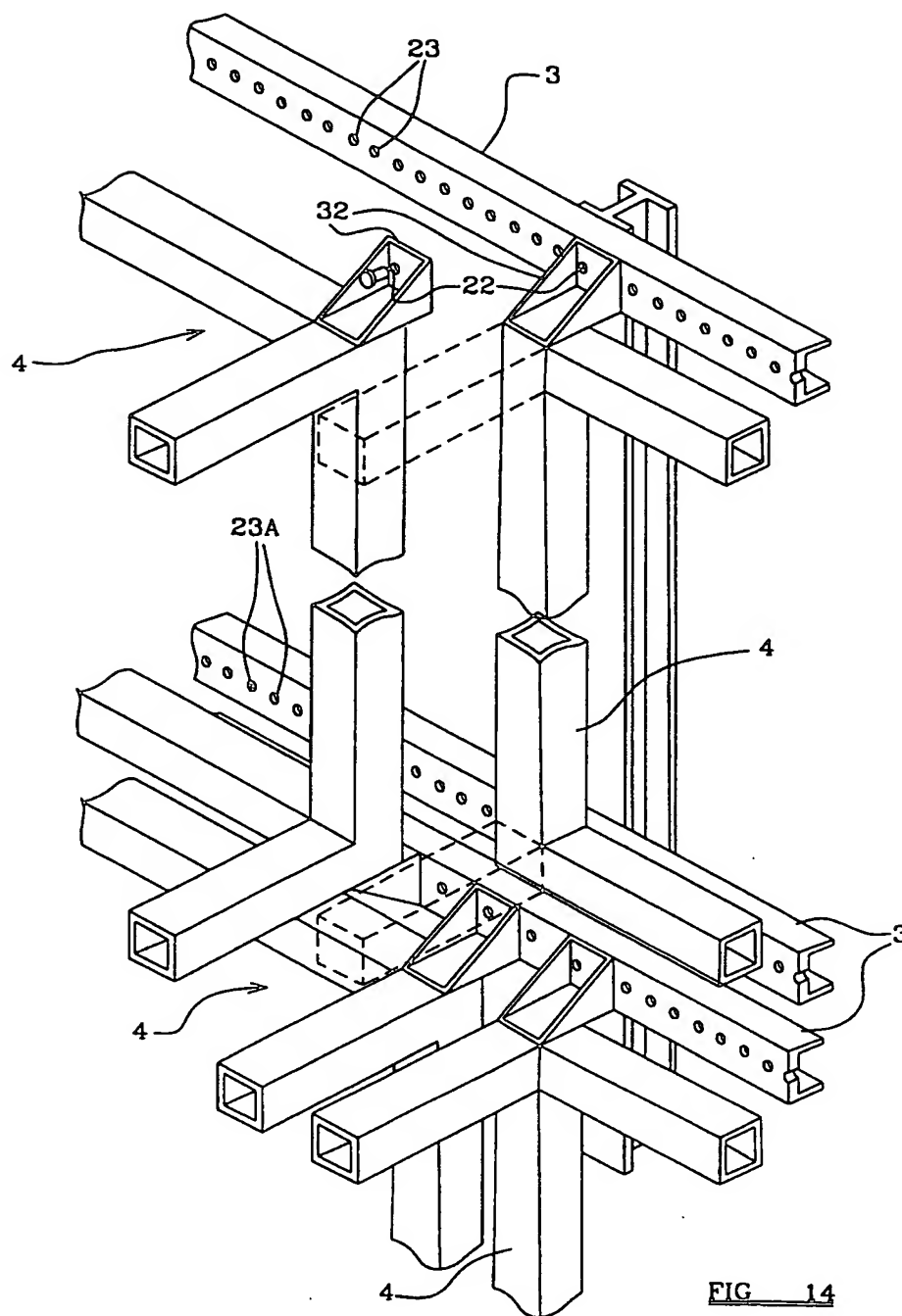


FIG 13

10 / 13



11 / 13

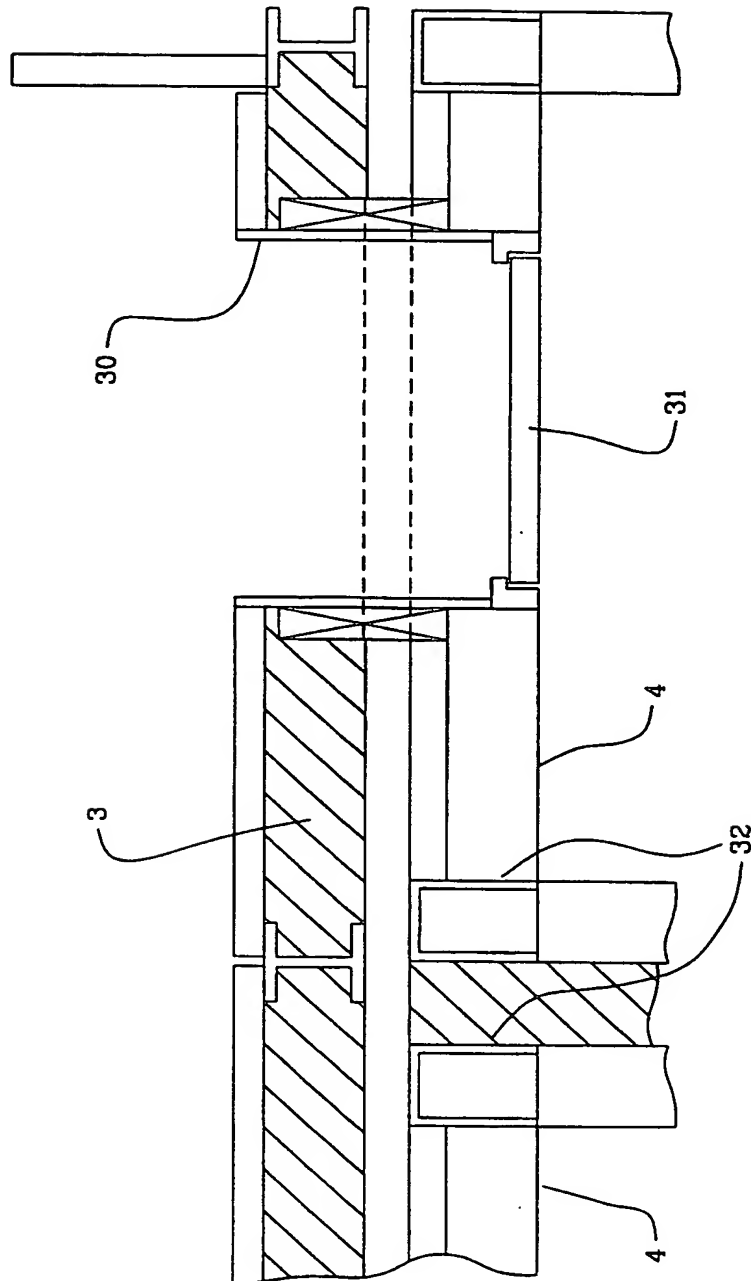


FIG. 15

12 / 13

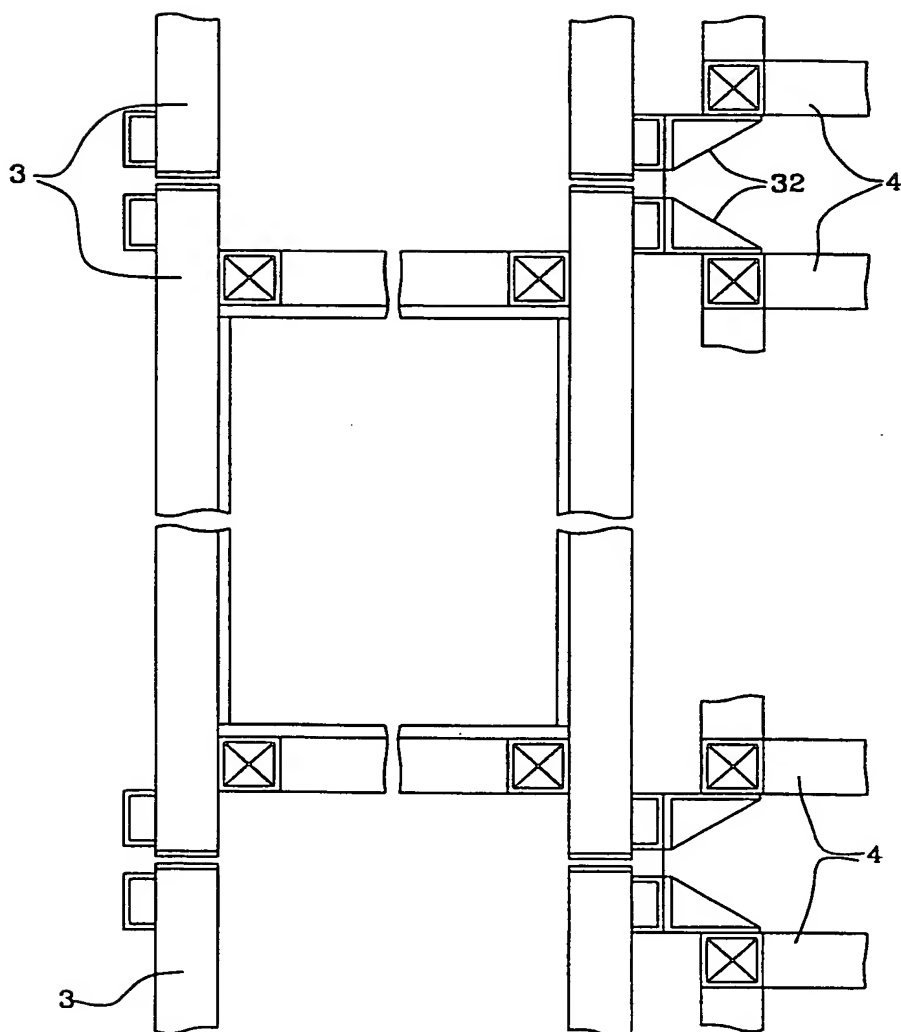


FIG 16

13 / 13

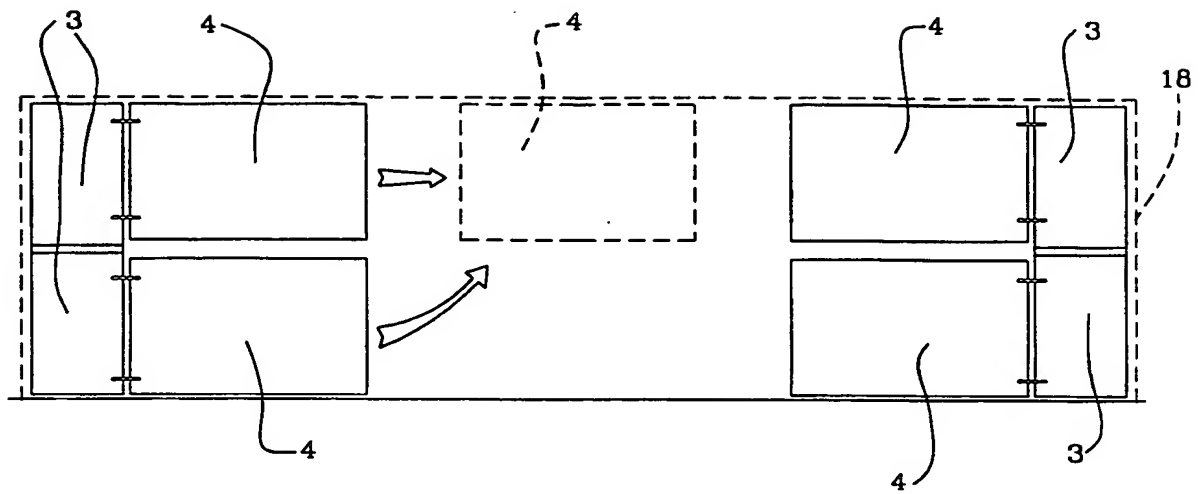


FIG 17

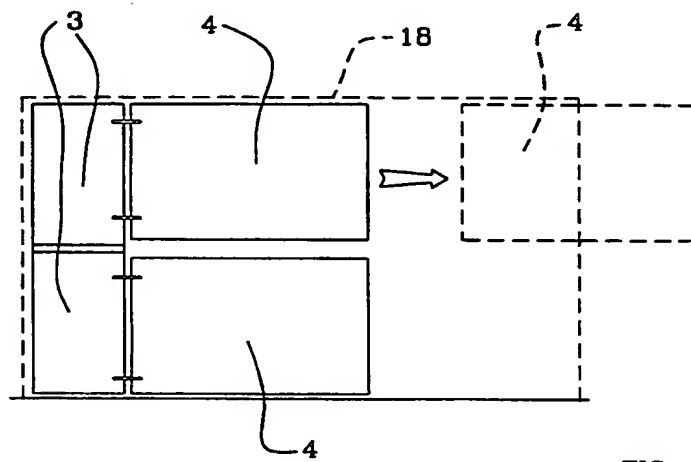


FIG 18

INTERNATIONAL SEARCH REPORT

Int [REDACTED] Application No
PCT/JP 00/01892

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E04B1/348 E04B1/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 444 130 A (WYBAUW JACQUES) 11 July 1980 (1980-07-11)	1-5, 7, 8, 10-12, 14-17, 21, 25-27, 31-33, 35-38, 40
Y	the whole document	22-24, 28-30
A	— —/—	9, 13

☒ Further documents are listed in the continuation of box C.

X Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *G* document member of the same patent family

Date of the actual completion of the international search

5 September 2000

Date of mailing of the international search report

11/09/2000

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3018

Authorized officer

Delzor, F

INTERNATIONAL SEARCH REPORT

Int. Application No.
PCT/GB 00/01892

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 23 06 865 A (FUHRMANN HANS JOACHIM) 22 August 1974 (1974-08-22)	1-4, 14, 25-27, 31-36, 38-41
A	the whole document	22, 32, 33, 37, 42
Y	US 3 818 654 A (SCHRAMM R) 25 June 1974 (1974-06-25) the whole document	22-24, 28-30
A	US 4 766 708 A (SING PETER) 30 August 1988 (1988-08-30) the whole document	41, 42

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int Application No

PCT/GB 00/01892

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2444130	A	11-07-1980	AR 221389 A	30-01-1981
			AT 755079 A	15-03-1985
			AU 530363 B	14-07-1983
			AU 5330379 A	10-07-1980
			BE 880525 A	10-06-1980
			BR 7908052 A	08-07-1980
			CA 1129617 A	17-08-1982
			CH 635641 A	15-04-1983
			CU 35191 A	28-03-1982
			DD 147702 A	15-04-1981
			DE 2965875 D	18-08-1983
			DK 523979 A	12-06-1980
			EP 0012736 A	25-06-1980
			ES 257026 U	16-12-1981
			FI 793850 A	12-06-1980
			GB 2040334 A, B	28-08-1980
			GR 73603 A	26-03-1984
			IE 49009 B	10-07-1985
			IL 58909 A	30-04-1982
			IN 153401 A	14-07-1984
			IT 1119965 B	19-03-1986
			JP 1348481 C	13-11-1986
			JP 55081949 A	20-06-1980
			JP 61014299 B	18-04-1986
			KE 3638 A	20-06-1986
			LU 81973 A	01-07-1980
			MX 149994 A	27-02-1984
			MY 98685 A	31-12-1985
			NO 794015 A	12-06-1980
			NZ 192297 A	15-07-1983
			OA 6422 A	12-06-1979
			PL 220316 A	20-10-1980
			PT 70541 A	01-01-1980
			TR 22071 A	11-03-1986
			US 4364206 A	21-12-1982
			ZA 7906670 A	26-11-1980
DE 2306865	A	22-08-1974	NONE	
US 3818654	A	25-06-1974	NONE	
US 4766708	A	30-08-1988	JP 62160375 A	16-07-1987